SURVEILLANCE OF THE BISON CONTROL AREA DECEMBER 1995 – APRIL 1996

Northwest Territories Resources, Wildlife & Economic Development

103-06924/

SURVEILLANCE OF THE BISON CONTROL AREA DECEMBER 1995 – APRIL 1996

R. ANTONIAK AND C.C.GATES

DEPARTMENT OF
RESOURCES, WILDLIFE AND ECONOMIC DEVELOPMENT
GOVERNMENT OF THE NORTHWEST TERRITORIES
FORT SMITH, NWT
1996

Manuscript Report No. 99

The Contents of this Paper are the Sole Responsibility
of the Authors

ABSTRACT

In 1987, a Bison Control Area (BCA) and associated surveillance program were established in the southern Northwest Territories. The purpose of the program is to reduce the risk of infection of the Mackenzie and Nahanni wood bison populations with bovine tuberculosis and brucellosis. These diseases are present in bison herds in the Slave River Lowlands, and Wood Buffalo National Park.

The 1995-96 bison control program began with uncertainty due to complications encountered in reaching agreement between GNWT and Canadian Heritage on management and funding of the program. Negotiations resulted in several changes to the surveillance program. The joint operational area was reduced from the entire BCA to only the eastern half of the BCA and a narrow zone along the Mackenzie River. The frequency of surveillance flights was reduced from bimonthly to monthly flights in the eastern portion of the BCA. The frequency of surveillance of the Mackenzie River shoreline near the Mackenzie bison population was maintained on a weekly basis.

Aerial surveillance flights were conducted between December 8, 1995 and April 23, 1996. Surveillance of the Mackenzie River between Mills Lake and Pointe du Roche was flown weekly. This section of the Mackenzie River holds the highest probability of bison crossing from the north into the BCA. Additional monthly surveillance flights were flown to search the northern interior of the BCA lying between the Redknife and Buffalo rivers, and north of the highway system. A comprehensive aerial survey was carried out in March 1996.

No bison were sighted in the BCA during regular aerial surveillance flights. Four reports from the public were called into the Department of Renewable Resources Office in Fort Providence throughout the course of the winter. All reports were taken seriously and verification patrols were made. Two reports resulted in bison being located on the south shore. A small herd of ten bison crossed the Mackenzie River near Fort Providence on January 25, 1996. This sighting was reported by an NWT Department of Highways employee. In this instance the ten animals were driven back to the north shore with the use of an aircraft before they could disperse further into the BCA. On March 19, 1996 three cows were sighted and killed by a Fort Providence hunter. There was no evidence of disease based on serology for brucellosis (n=2) or of gross pathology for tuberculosis (n=3).

TABLE OF CONTENTS

ABSTRACT iii

LIST OF FIGURES vii

LIST OF TABLES ix

INTRODUCTION 1

METHODS 2
Aerial Surveillance 2
Ground Surveillance 8
Public Involvement 8

RESULTS 10

DISCUSSION 14

RECOMMENDATIONS 18

ACKNOWLEDGMENTS 21

LITERATURE CITED 22

APPENDIX A 23

APPENDIX B 26

LIST OF FIGURES

Figure 1. Locations of healthy free-roaming (light shading) and captive bison herds (stars), and free-roaming bison herds infected with brucellosis and tuberculosis (stipled dark shading) 3

Figure 2. Location of the Bison Control Area and surveillance zones 4

Figure 3. Generalized flight plan for shoreline patrols on the northern boundary of the BCA 6

Figure 4. Checkpoints established to guide aerial surveillance of Zone I in December 1995 (a) and January-February 1996 (b) 7

Figure5. Survey flight path followed during a comprehensive survey of BCA Zones I and II in March 1996 9

Figure 6. Location of bison sightings (dots) in and near the BCA between December 1995 and April 1996 and the location of three bison killed by a hunter (triangle) in March 1996 13

Figure 7. Distribution of bison sightings reported since 1976 in the region west of Wood Buffalo National Park and south of the Mackenzie River 16

LIST OF TABLES

Table 1. Summary of surveillance flights in the Bison Control Area during December 1995 to April 1996. 11

INTRODUCTION

Brucella abortus and *Mycobacterium bovis*, the causative organisms for bovine brucellosis and tuberculosis respectively, are known to infect bison in Wood Buffalo National Park, northern Alberta, and the Slave River Lowlands (Tessaro et al. 1990). These populations serve as reservoirs of the cattle diseases and pose a threat to the specific disease-free status of the Mackenzie bison herd (Tessaro et al. 1993), the presumed disease-free status of the Nahanni herd located near the Mackenzie Mountains (Gates et al. 1992) and the Hay-Zama herd located in northeastern Alberta. The disease reservoirs also present an obstacle to reestablishing other healthy free-roaming herds in the region (Gates et al. 1992). The commercial bison ranching industry is growing rapidly in the region and its disease-free status is also threatened by the continued existence of infected free-roaming herds.

The risk of infection of the healthy bison herds is a chronic management problem (Wobeser, 1992) and the issue of how to deal with the diseased bison was reviewed by a Bison Disease Task Force in 1988, a federal Environmental Assessment and Review Process (FEARO, 1990) and the Northern Buffalo Management Board in 1992-93. The Department of Canadian Heritage is currently addressing the issue through a five-year program which involves research on the diseases and bison ecology, and containment of infected bison within the boundaries of Wood Buffalo National Park.

In 1987, the Government of the Northwest Territories implemented a program to reduce the risk of contact between infected and disease-free bison, (Gates and Gray, 1992; and Gates, et. al., 1992). The program entailed defining an area from which bison are excluded through active management. The Bison Control Area (BCA) originally included lands south

of the Mackenzie River, and north of the Mackenzie Highway between Mills Lake (near Fort Providence) and Hay River. The BCA was expanded in 1990 to encompass all lands north of the NWT border and south of the Mackenzie River, lying between the Trout River in the west and the Buffalo River and the western boundary of WBNP in the east, (Figure 1). The BCA encompasses 3,936,339 ha. Bison are designated as nuisance wildlife in the BCA under section 61 of the NWT Wildlife Regulations Act (Government of the Northwest Territories 1992). This regulation stipulates that any bison sighted in the BCA may be shot by an eligible NWT hunter.

Since 1993 the bison control program has been jointly funded by the Department of Renewable Resources and Canadian Heritage. The cost of surveillance of part of the BCA (Zones I and II, Fig. 2) is jointly funded under an agreement between the two agencies.

The objectives of the Northwest Territories bison control program are to detect and remove any bison in the BCA, and to prevent the establishment of bison herds or individuals in this area. This objective serves the goal of lowering the risk of contact between bison in non-infected and infected bison herds.

This report summarizes the results of the bison control program for the time period December 1995 to April 1996.

METHODS

Aerial Surveillance

Aerial surveillance flights, using either a Cessna-185, or Cessna-150 fixed wing aircraft, were routinely conducted over the BCA from December 8, 1995 until April 23, 1996. The BCA was divided into three zones (Figure 2). Zone I covered the area between the

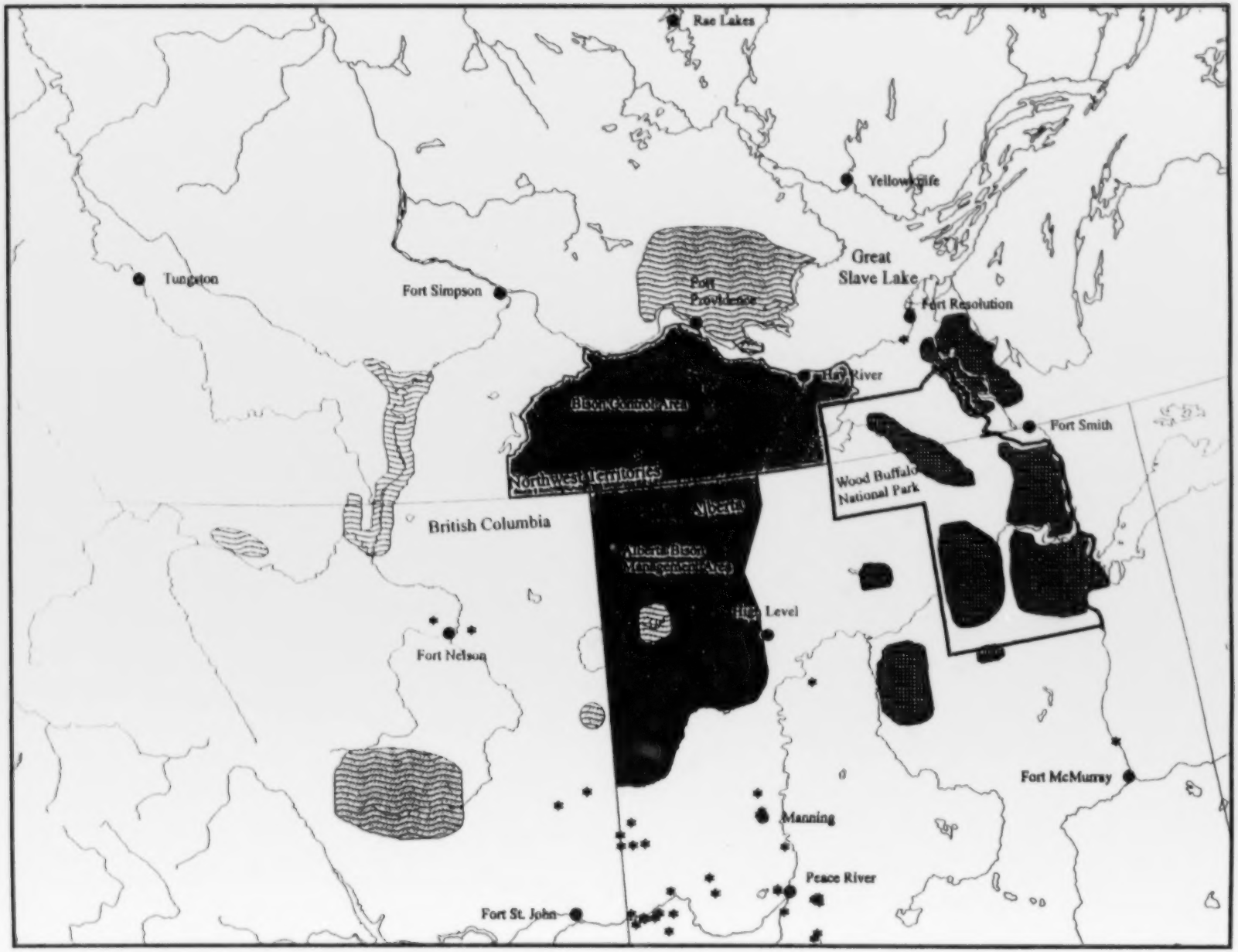


Figure 1. Location of healthy free-roaming(light shading) and captive(stars) bison herds, and free-roaming bison herds infected with brucellosis and tuberculosis(stipled dark shading)

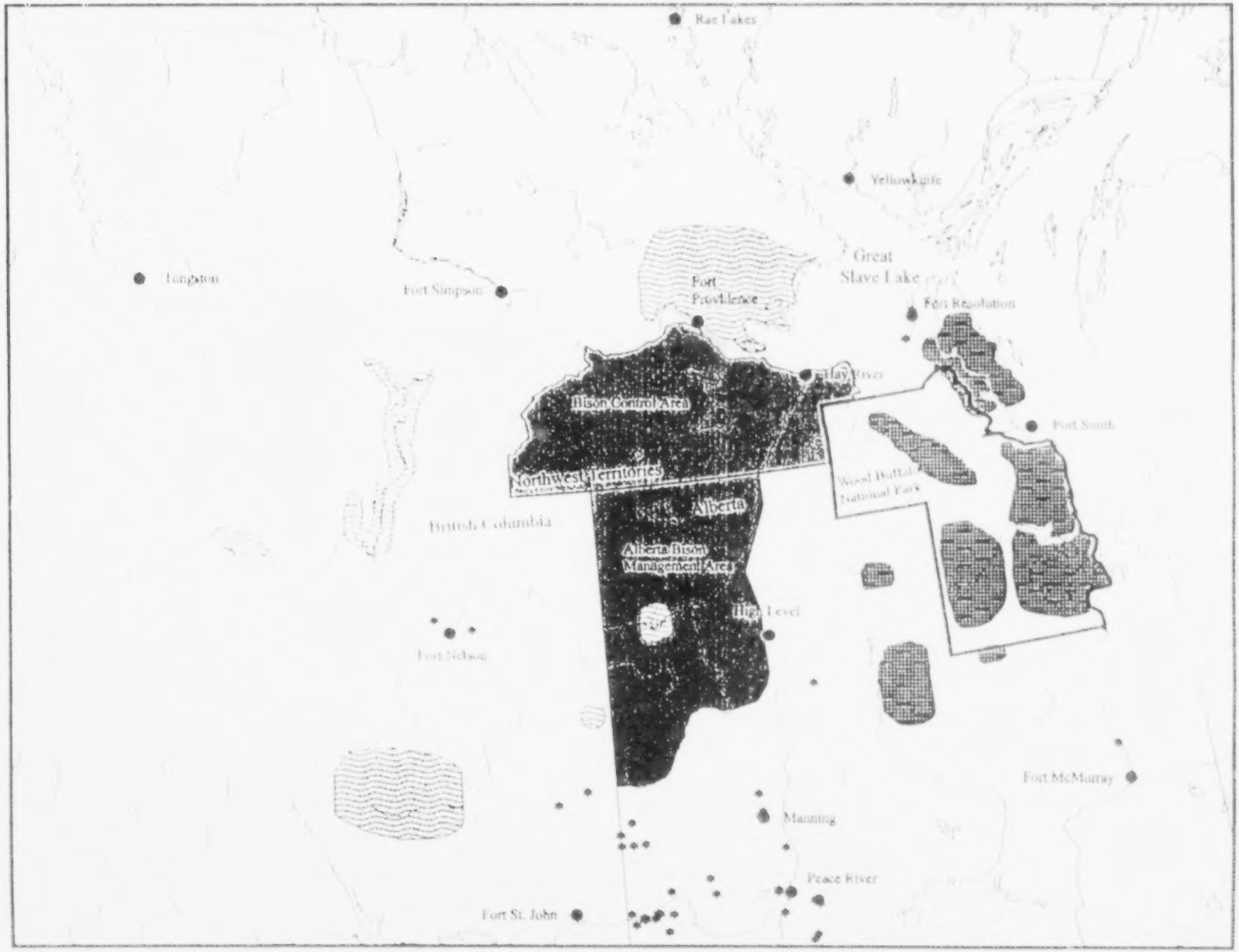


Figure 1. Location of healthy free-roaming(light shading) and captive(stars) bison herds, and free-roaming bison herds infected with brucellosis and tuberculosis(stipled dark shading)

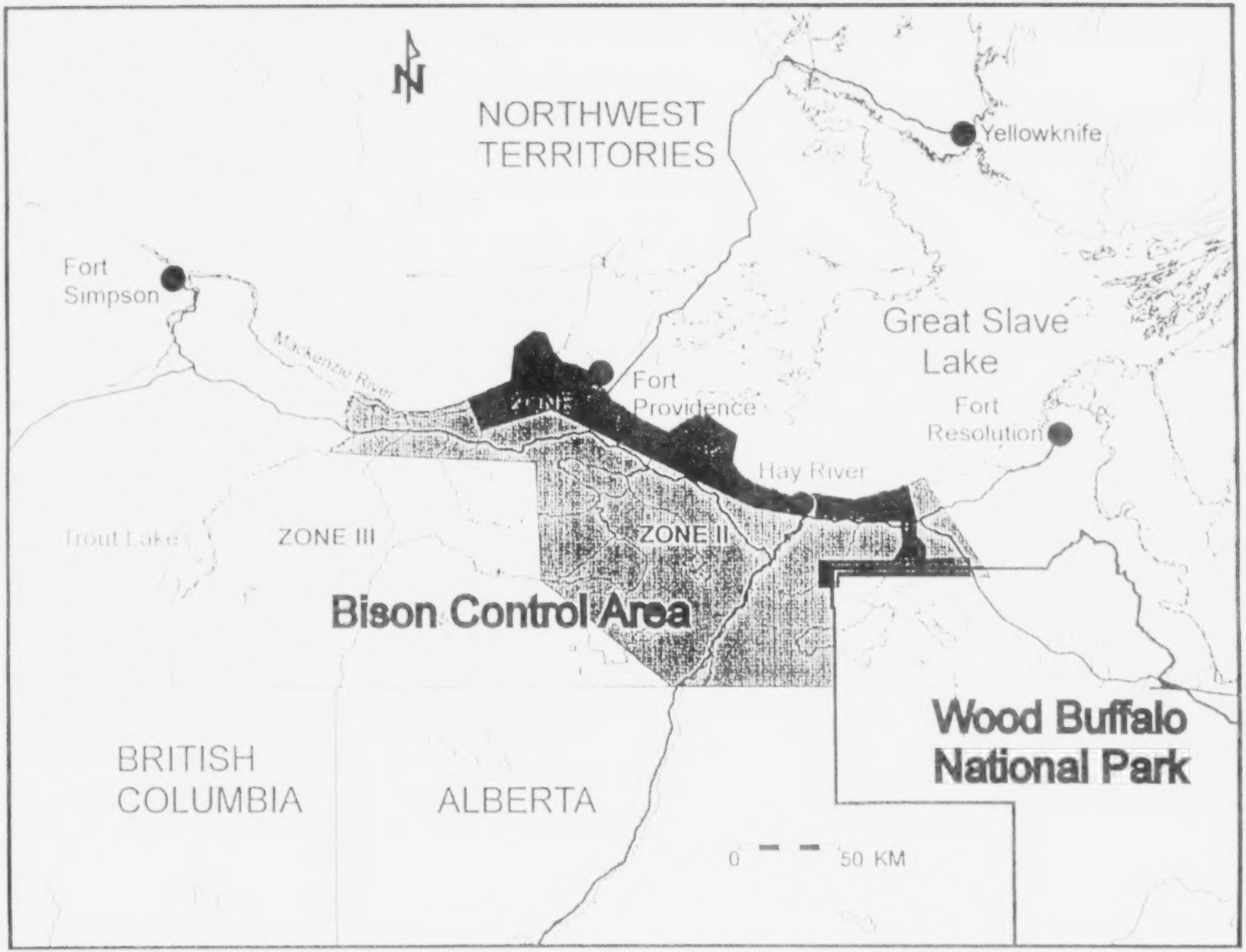


Figure 2. Location of the Bison Control Area and surveillance zones

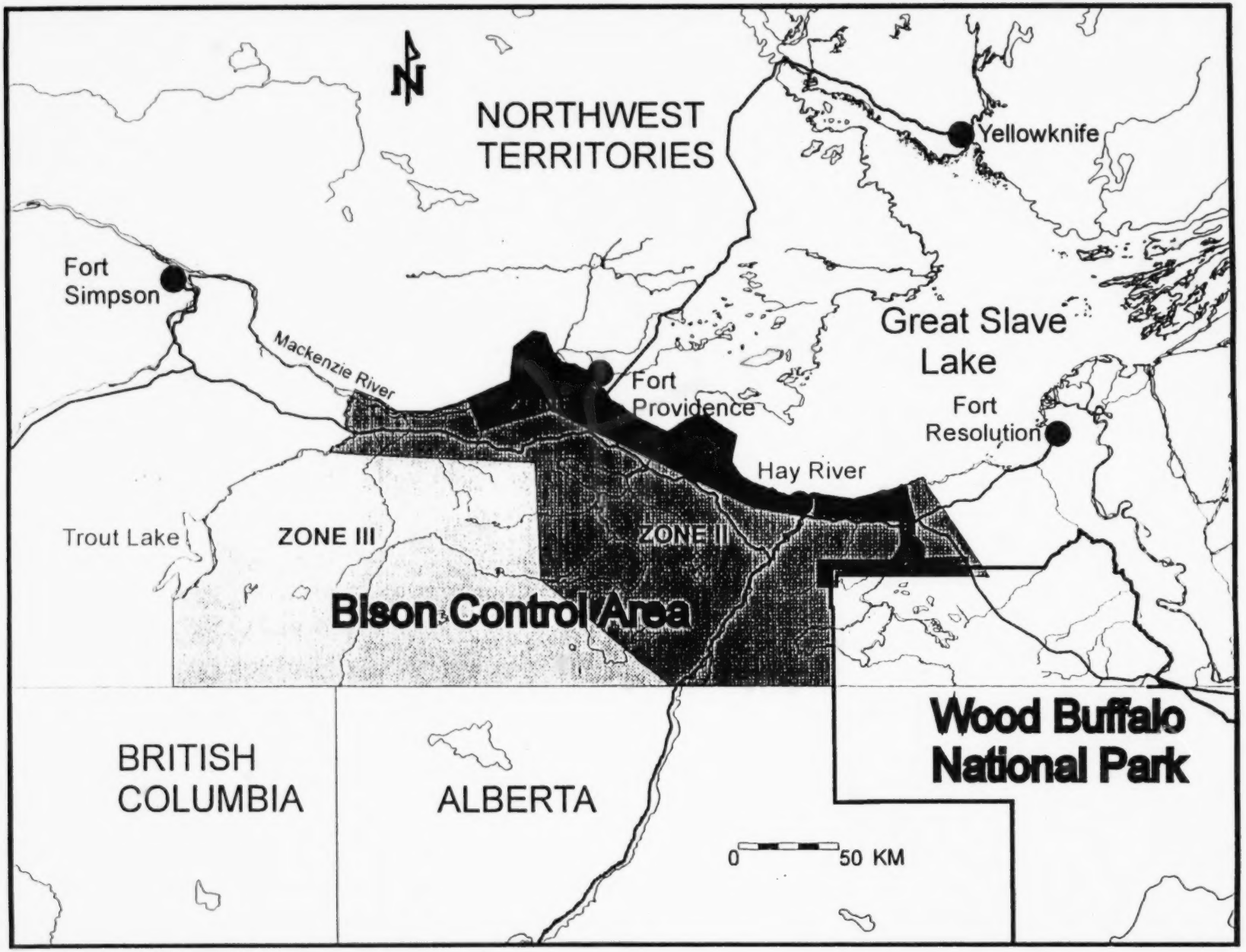


Figure 2. Location of the Bison Control Area and surveillance zones

Mackenzie Highway system and the Mackenzie River, bounded by the Redknife River in the west and the Buffalo River to the east. Zone II covered the eastern half of the BCA and Zone III the western portion. The Mackenzie shoreline between Mills Lake and Point du Roche was identified as a high risk area for bison activity. Weekly flights along this stretch of shoreline were conducted with a Cessna-150 between December 19, 1995 and April 23, 1996 (Figure 3). No flights were flown in Zone III in 1995/96.

A series of checkpoints was established throughout zone one to guide surveillance flights (Figure. 4). Flight paths between points were flown in a flexible, meandering manner to take into consideration the terrain, habitat, animal tracks and trails. Times were recorded on reaching each checkpoint to ensure that observers systematically searched the areas between the checkpoints. Extensive coverage of Zone I was flown once a month from December through February. Sixteen hours of survey time was utilized on each of these monthly flights.

Attempts were made to conduct the flights during optimum snow and light conditions whenever possible, however, some flights were made in less suitable conditions in order to maintain surveillance throughout the winter months. Surveillance flights were flown at an altitude of 100-170 metres above ground level (300-500 ft), depending on the terrain and habitat, at an average speed of 150 km/hr (approx. 75 knots/hr, 95 miles/hr).

Community observers were hired to assist the bison control technician with the aerial flights. Teresa Blaine was hired out of Fort Providence and when she was unavailable Edward Landry filled in. Art Look, an elder of Fort Providence, was also involved in the shoreline flights conducted in March. Jim Thomas was an observer from Hay River.

A comprehensive survey of Zones I and II was conducted during March 11-16 (Figure

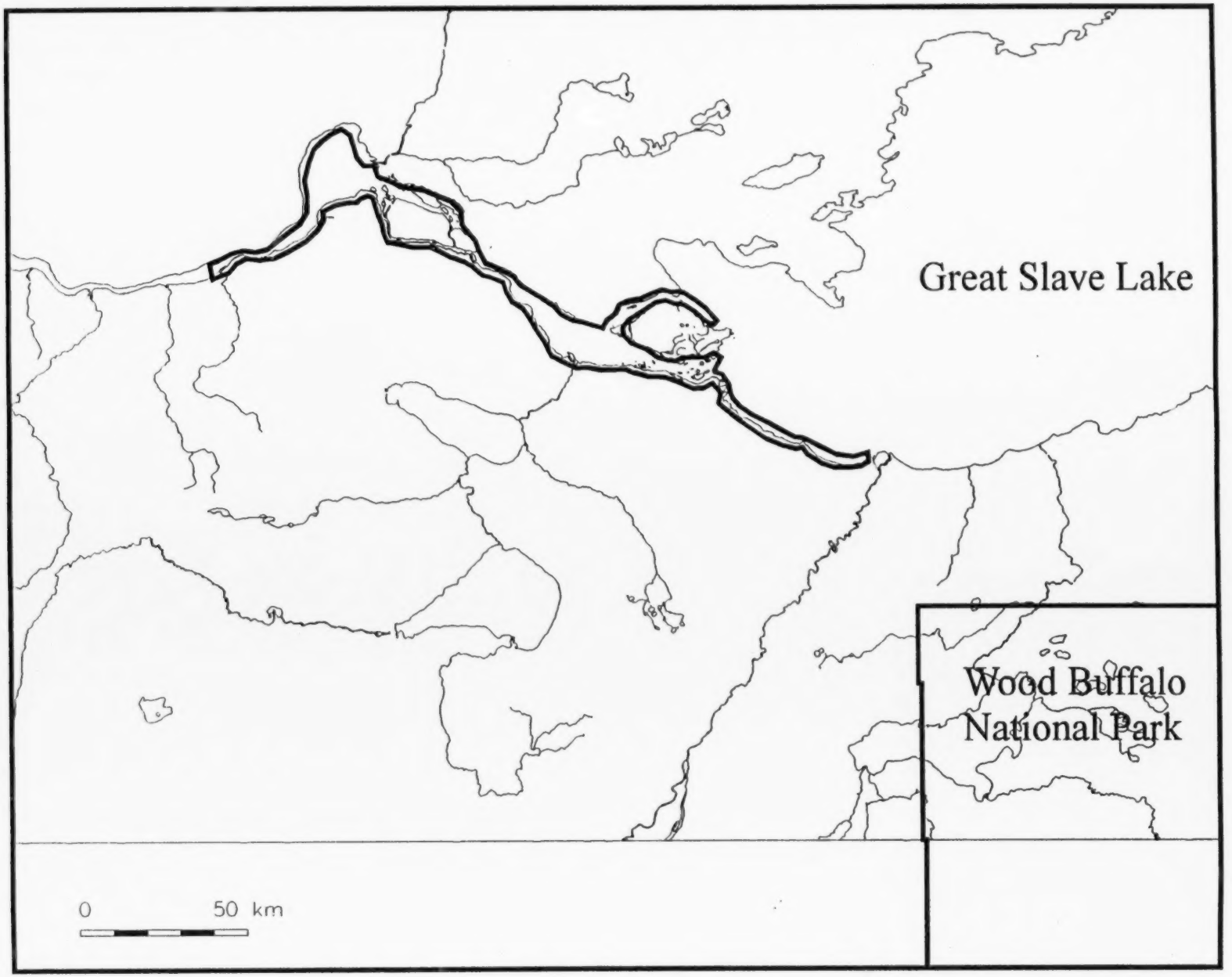


Figure 3. Generalized flight plan for shoreline patrols on the northern boundary of the BCA

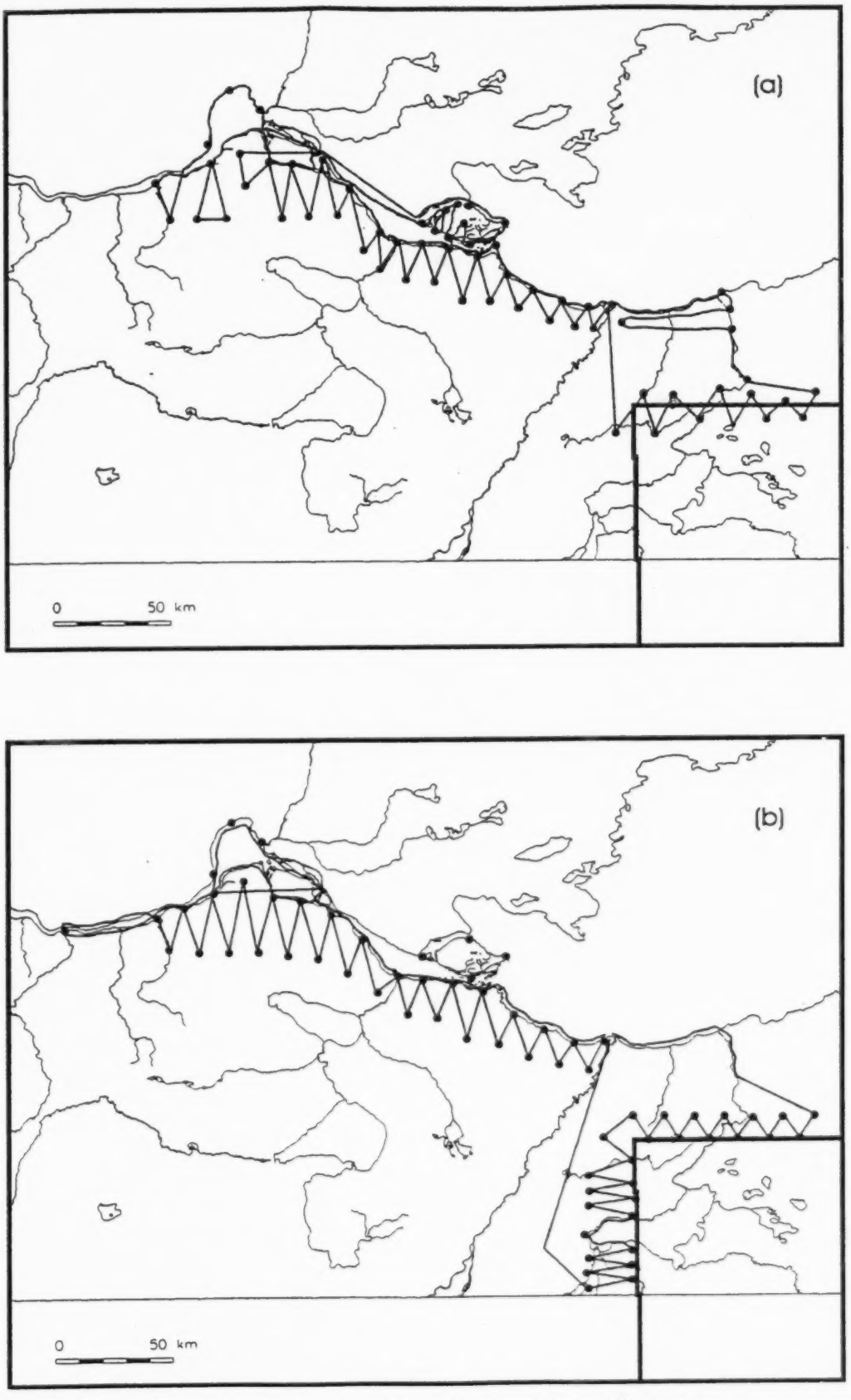


Figure 4. Checkpoints established to guide aerial surveillance of Zone I in December 1995(a) and January - February 1996(b)

5). The surveillance flight pattern used for this extensive search was adapted from the method used in 1992 (Gates et al. 1992). Transects were set 3 degrees apart throughout Zone I, and 6 degrees apart in Zone II. In order to search the area thoroughly, deviations were made from linear flight paths upon detecting animals or tracks. Habitat most likely to contain bison was also sought out and thoroughly checked.

Wildlife sightings and locations were noted during all flights. Observations were recorded in degrees, minutes and seconds using a global positioning system and were entered on a database file (Dbase). The data was integrated into a computer mapping program (Quikmap, Axys Software Ltd., Sydney, British Columbia). Maps were further edited and produced using Corel Draw, ver.4.

Ground Surveillance

Ground patrols between Fort Providence and Hay River were incorporated into the annual surveillance schedule from 1993 through 1995. These patrols were discontinued this year based on the limited effectiveness of ground patrols in detecting large mammals as compared to aerial surveillance. In place of ground patrol support staff, two community observers were hired to help in aerial surveillance, one from Hay River and the other from Fort Providence. Ground support staff would have been hired as required if bison were sighted during the regular aerial searches.

Public Involvement

A concerted effort was made to increase public awareness of the bison control program during the 1995-96 season. A brochure produced originally in 1990 was revised and republished. The brochures were distributed to communities and other public outlets in and

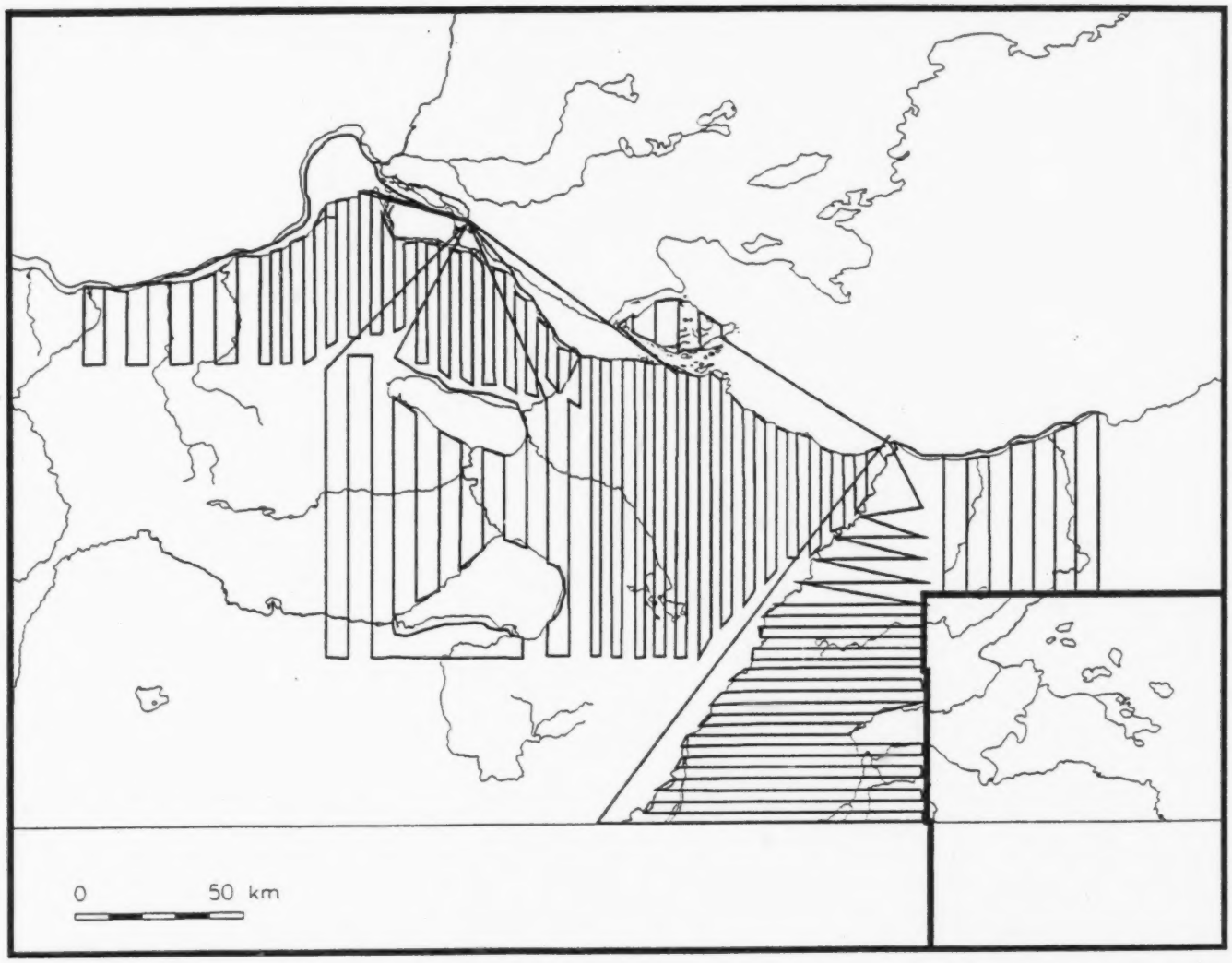


Figure 5. Survey flight flight path followed during a comprehensive survey of BCA Zones I and II in march 1996

around the BCA. Two posters were also designed, one visually depicting the effects of the diseases tuberculosis and brucellosis, while the other focused on the Bison Control Area in relation to the healthy and diseased herds. The posters were posted for the travelling public using the highway corridors passing through the BCA, and were sent to communities within or near the BCA.

Members of the public were asked to report any bison they saw in the BCA to the Department of Renewable Resources. Signs were posted in 1991 along highways at various entry points into the BCA (at the NWT/Alberta border crossing on the Mackenzie Highway, near Fort Providence and at Buffalo River) to alert travellers about the bison control program.

RESULTS

In total, 128.8 hours were flown during 15 surveillance and 4 verification patrols in the BCA (Table 1). Of these, 48.2 hours were flown during intensive surveillance of Zone I during December to February. An additional 40.7 hours was flown during an extensive survey of Zones I and II in March; 34.5 hours were flown during weekly shoreline surveillance of the high risk area; and 5.4 hours were flown during verification patrols.

Large mammals were regularly sighted in the BCA during aerial surveys. Locations of sightings are illustrated in Appendix A. Moose (n=299) were the most common large mammals seen in the BCA. Woodland caribou (n=189) and wolves (n=20) were also commonly seen.

No bison were sighted in the BCA during scheduled aerial surveys. However, bison

Table 1. Summary of surveillance flights in the Bison Control Area during December 1995 to April 1996.

Comprehensive surveillance in Zones I and II

Zone	Date	Hours Flown
1	December 8-11	16.3
1	January 16-19	16.2
1	February 12-15	15.7
1&2	March 11-16	40.7
	Sub-total	**88.9**

Shoreline Surveillance Flights

Date	Hours
December 19	2.5
December 28	2.9
January 3	3.0
February 1	1.7
Febraury 8	5.5
February 22	2.7
February 29	2.6
March 16	2.7
March 29	2.7
April 10	4.3
April 23	3.9
Sub-total	**34.5**

Verification Flights

January 25	2.3
March 19	1.2
March 22	0.5
March 23	1.4
Sub-total	**5.4**

GRAND TOTAL	**128.8**

were routinely seen along the north shore of the Mackenzie River (Figure 6). Four public reports of bison on the south shore resulted in three verification patrols. On December 12, Evelyn Krutko, the Renewable Resource officer in Fort Providence received a call reporting six bison near Calf Island in the Mackenzie River. The verification flight did not find any bison and it is believed that a group of willows and the sun's angle at the time created an optical illusion. Several local residents from Fort Providence snowmobiled into the area after the report but also saw no animals. This area was scouted on subsequent aerial patrols. Bison have been spotted previously on the north shore at the mouth of the Horn River. The ice in the area across to Calf Island was quite smooth this year, hence there was no barrier to bison crossing the river.

The second incident of bison on the south shore was reported by Dennis Bonnetrouge, a GNWT Department of Transport employee, who spotted a small herd of ten animals on January 25, 1996. His immediate action of reporting the incident to the wildlife officer in Fort Providence allowed a plane to be dispatched within fifteen minutes of the sighting. The ten animals were located on the south shore of the Mackenzie River and were hazed back onto their own trail using a Cessna-185. This was accomplished by getting two, then another three animals back onto the river. The remaining five followed voluntarily. Once the bison were redirected onto their trail they were hazed towards to the north shore. This small group of eight adults and two calves crossed the Mackenzie River west of the ferry crossing where the ice was fairly smooth.

James Christie informed Evelyn Krutko that three cows were sighted on the south shore on March 19,1996. A verification patrol was made and three bison were located (61 14.9662N,

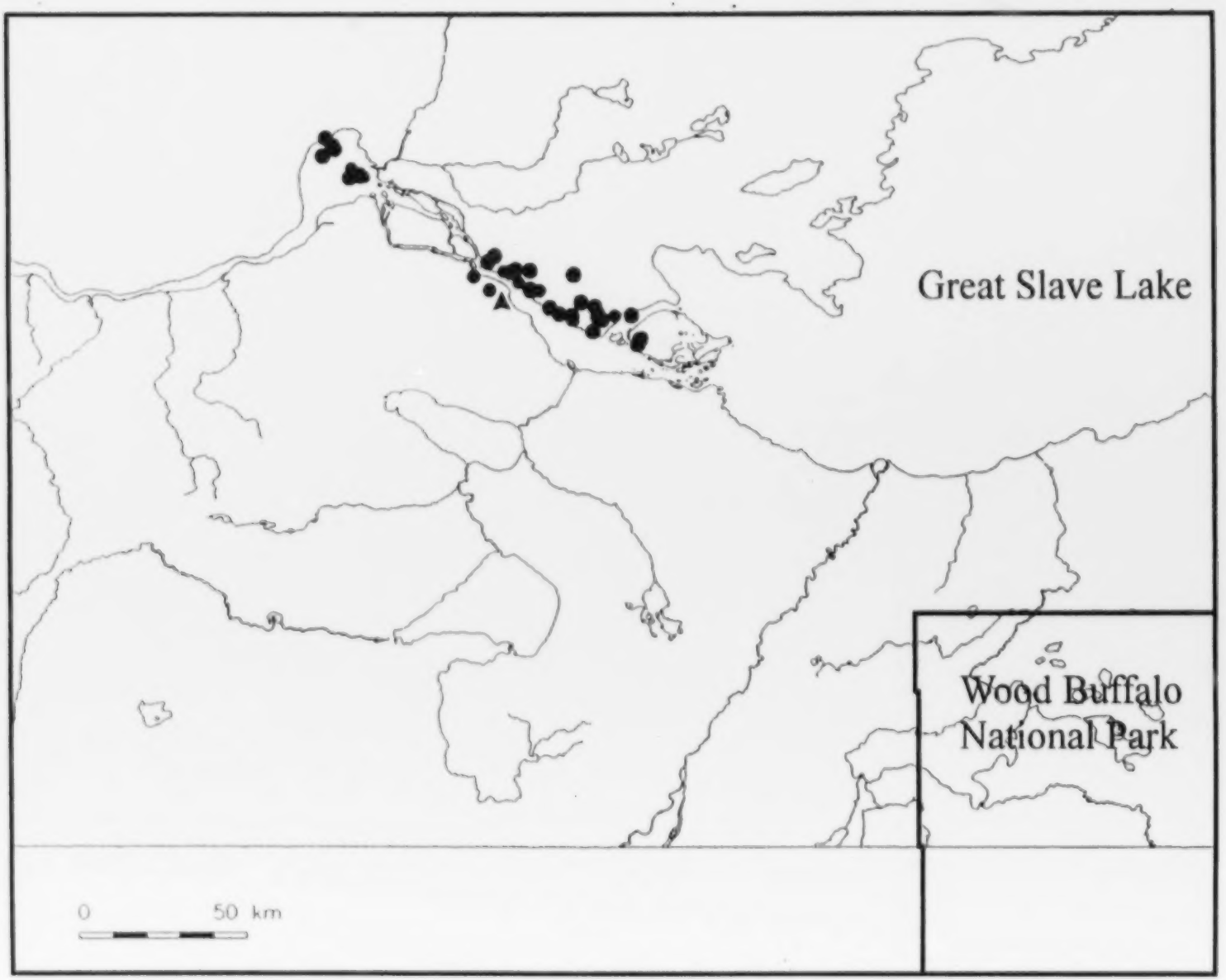


Figure 6. Location of bison sightings (dots) in and near the BCA between December 1995 and April 1996 and the location of three bison killed by a hunter (triangle) in March 1996.

117 29.7412 W). The three cows had travelled for approximately ten kilometres from a north westward direction before being sighted. By the time the verification patrol scouted the area, Philip Elisie, a local hunter, had already successfully stalked and killed the three animals before they wandered further into the BCA interior. The meat from the kills went back to the community of Fort Providence. Prior to the meat being removed from the kill site, Evelyn Krutko and Troy Ellsworth, collected blood serum (n=2) and retropharyngeal lymph nodes (n=3) from the culled bison. A post-mortem examination of the cows indicated that they were all in good condition with ample amounts of internal fat. There were no visible gross lesions indicative of disease. There was no serological evidence of brucellosis as evaluated by the Animal Disease Research Institute, Agriculture and Agri-Foods Canada. The lymphatic tissue was normal on gross examination.

Further sightings were reported of two more bison on March 22. No bison or evidence of tracks were seen on a subsequent verification patrol. The locations of bison sightings made in and near the BCA during the control program period are illustrated in Figure 6.

Throughout the course of the BCA project Parks Canada in Fort Smith was kept informed of aerial surveillance plans and any occurrences within the BCA. Their staff also took part in the February survey flight of the western portion of zone one.

DISCUSSION

The bison control program was established in 1987 and the area was expanded in 1990 to reduce the risk of infection of the Mackenzie and Nahanni bison herds with *B. abortus* and *M. Bovis*. Bison may move into the BCA from a number of sources, including sub-populations

in Wood Buffalo National Park, from the Mackenzie herd, the Nahanni herd, the Hay/Zama herd, from other remnant herds or wandering individuals in northern Alberta.

Bison dispersal is known to occur by two mechanisms, innate or random diffusion, and density dependent pressure-threshold dispersal (Gates and Larter 1990). Adult males tend to disperse in a random fashion, even when populations are at a low density, moving as individuals or in small groups into unoccupied habitat. This explanation is consistent with the pattern of scattered observations of single or small groups of bison in northern Alberta and the southern Northwest Territories (Figure 7). Females are rarely found as singles, rather they tend to disperse in herds, it is believed largely in response to intraspecific competition for food. Both mechanism are operating in the Mackenzie bison range. High grazing pressure is evident in the core of the bison range where in 1990 and 1991, two thirds of annual forage production at Falaise Lake was grazed during the summer (Larter 1994).

Since the level of emigration by either mechanism is a function of population size, the most significant potential source of immigrants into the BCA is the largest population, the Mackenzie herd. The rate of emigration is exacerbated by intraspecific competition for food. The Government of the Northwest Territories is attempting to decrease grazing pressure through a habitat enhancement program using prescribed burning to increase the area and quality of meadows available to bison in the Fort Providence area.

In order to best achieve the goal of preventing the spread of diseases, it is crucial that bison entering the BCA be eliminated and that the Mackenzie herd not be allowed to disperse south of the Mackenzie River. Since the pattern of range use has encompassed riparian meadows along the north shoreline of the Mackenzie river, intensive surveillance of the high

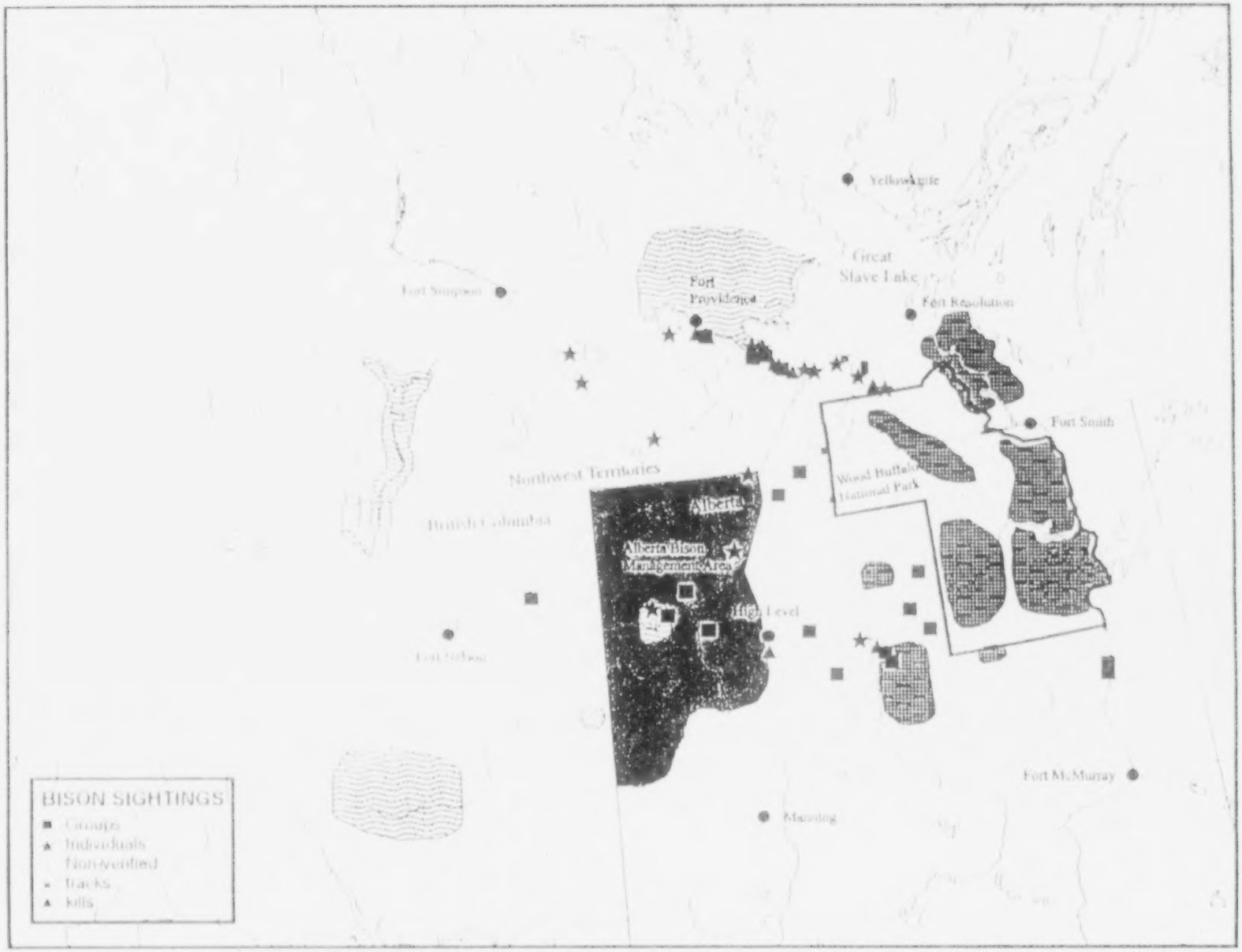


Figure 7. Distribution of bison sightings reported since 1976 in the region west of Wood Buffalo National Park and south of the Mackenzie River.

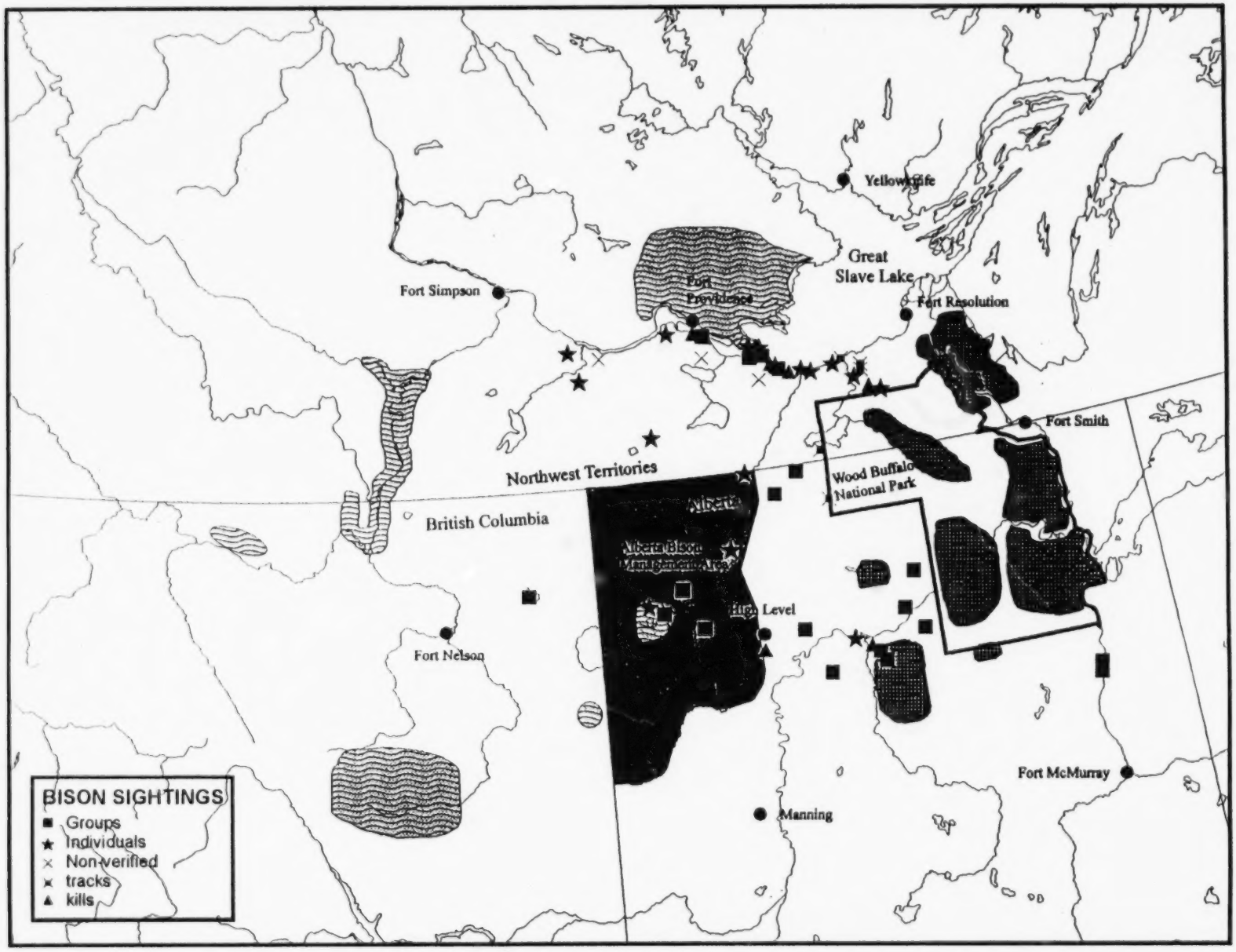


Figure 7. Distribution of bison sightings reported since 1976 in the region west of Wood Buffalo National Park and south of the Mackenzie River

risk zone (Zone I) of the BCA is necessary.

Bison may cross the frozen Mackenzie River or Great Slave Lake at many locations where the ice surface is smooth. For example, in 1992, 11 bison crossed an expanse of 40 km of lake ice between Moose Point and Pointe du Roche. A single incident involving a bison crossing the Mackenzie River in 1995 occurred near Fort Providence where relatively smooth ice prevailed. Three bison killed in the BCA by a hunter in March 1996 also may have taken advantage of the smooth river ice between the mouth of the Horn River and Fort Providence. There are several islands east of Meridian Island that are linked by smooth ice, creating an easy passage route for bison to the south shore. In total, 13 bison have been killed in the BCA since the program began.

The shores of the Mackenzie River generally flood each spring and this process naturally rejuvenates the vegetation. As water levels recede in the summer, lush sedge and grass swards are exposed and later become attractive winter range. Bison were again observed along the north shore of the Mackenzie River throughout the winter. Herds utilizing shorelines around Beaver Lake and Big Island were smaller and more dispersed than observed in last year's distribution surveys. Very few animals spent time roaming the Big Island area in 1995-1996 compared with the previous year. The concentration of bison along the Mackenzie River this season shifted to the Mills Lake area. Winter water levels were low and resulted in larger areas of exposed sedge/grass meadow. Mills Lake was also part of the habitat enhancement program and prescribed burning in the past two springs may have contributed to the bison using the area in larger numbers in winter 1995-1996.

Observations of possible bison sightings were reported by members of the public on

four occasions this year. Public information remains a vital method for obtaining information on the occurrence of bison in the BCA, despite the fact that not all reports lead to confirmed sightings. The importance of public support cannot be over-emphasized; public reporting is the most efficient and effective means of obtaining information. Though improvements were made towards better public awareness this year, more can be done. More frequent visits by personnel, specifically the Bison Control Technician, should be made to communities including Trout Lake, Fort Simpson, Kakisa, Enterprise, Fort Providence and Hay River.

Major changes were made to the bison control program operational plan as a result of negotiations between the two funding agencies, GNWT and Canadian Heritage. The area designated as Zone III (Figure 2) was excluded from the joint operation at the request of Canadian Heritage and the comprehensive surveillance of Zone II was reduced from two surveys to one. The frequency of surveillance of Zone I was reduced from bimonthly to once each month. Weekly patrols of the Mackenzie River shoreline were maintained. The two funding agencies took longer to reach agreement on procedures than in the previous years. The delay caused last minute timing problems in requisitioning aircraft and resulted in higher costs to the program. Earlier negotiations to reach agreement on a mutually acceptable program for next year may allow for the agencies to satisfy their policy and financial management requirements without delays to program delivery.

RECOMMENDATIONS

1. Bison were not found in the BCA during the extensive survey conducted in March 1996. Nevertheless, surveys such as this should be conducted to confirm that bison are not

present in the BCA. The absence of bison should not be assumed.

2. Publicity on the program was improved this season and should be expanded even further next season. A well advised public will be more likely to report sightings. Some suggestions for next season are:

   - increase direct contact with communities;

   - an up-dated TV advertisement;

   - an incentive program where individuals that report a verified sighting or kill a bison in the BCA are rewarded with a specially designed cap or t-shirt or pin;

   - a truckers bulletin posted where drivers can up-date bison sightings daily, not only along highways in the BCA but also north of the Mackenzie River;

   - local poster competition in community schools near and within the BCA depicting a bison control message;

   - newspaper articles and radio interviews.

3. Administrative arrangements should be in place by early October to avoid problems in activating a program budget or implementing the program on schedule.
4. A habitat map or georeferenced landsat image at a scale of 1:125,000 should be made available to assist in defining surveillance flight paths.
5. The program technician should be trained in applied anatomy and in conducting post-mortem evaluations, including proper blood collection, tissue collection and recognizing gross pathology.
6. The technician should carry a prepared post-mortem sampling kit.
7. Consideration should be given to simplifying the annual report format. A brief project

report similar to those produced by the Alaska Department of Fish and Game would be sufficient. The report should include the following headings: Project Title, Project Objectives and Activities, Work Accomplished During the Project Period, Occurrences of Bison in and Near the BCA, Survey Maps and Large Mammal Sightings.

ACKNOWLEDGMENTS

Several individuals aided in the field work for the 1995-96 bison control program. Without their support and dedicated efforts the operation would not have run so smoothly. DRR staff in Hay River, Fort Smith and Fort Providence diligently handled administration aspects such as staffing, filing and pay records. Resource Officers from Hay River (Tom Chowns, Al Helmer) and Fort Providence (E. Krutko, R. Sanderson) assisted on aerial surveillance flights when possible and shared their concerns and advice for continued success of the bison control program. Gratitude is expressed to community participants who assisted in or conducted surveillance flights. These individuals include Art Look, Edward Landry, and Theresa Blaine of Fort Providence and Jim Thomas of Hay River.

LITERATURE CITED

Bison Disease Task Force. 1988. Evaluation of brucellosis and tuberculosis in northern Canada. Agriculture Canada and Parks Canada, Ottawa.

EARP. 1990. Northern diseased bison: report of the environmental assessment panel. Federal Environmental Assessment Review Office, Ottawa.

Gates, C.C., B. Elkin, L. Kearey, and T. Chowns. 1992. Surveillance of the bison free management area, Jan-Jun 1992. NWT Dept of Renewable Resources Manuscript Report No. 65.

Gates, C.C. and S. Gray. 1992. Surveillance of the bison free management area, NWT. NWT Dept. of Renewable Resources Manuscript Report No. 50.

Gates, C.C., T. Chowns, and H. Reynolds. 1992. Wood buffalo at the crossroads. In Foster, J., D. Harrison, I.S. McLaren and B. Champion, (eds.), Buffalo, Univ. of Alberta Press: pp. 137-165.

Government of the Northwest Territories. Dept. of Renewable Resources: NWT Wildlife Act. Section 61 (August 10, 1992), Yellowknife.

Larter, N.C. 1994. Plant-Herbivore Dynamics Associated with an Erupting Ungulate Populations: A Test of Hypotheses. Ph.D. Thesis. University of British Columbia. 136 p.

Larter, N.C. and Gates, C.C. 1990. Home ranges of wood bison in an expanding population. J. Mammalogy. 71(4) : 604-607.

Tessaro, S.V., L.B. Forbes and C. Turcotte. 1990. A survey of brucellosis and tuberculosis in bison in and around Wood Buffalo National Park, Canada. Can. Vet. J. 31: 174-180.

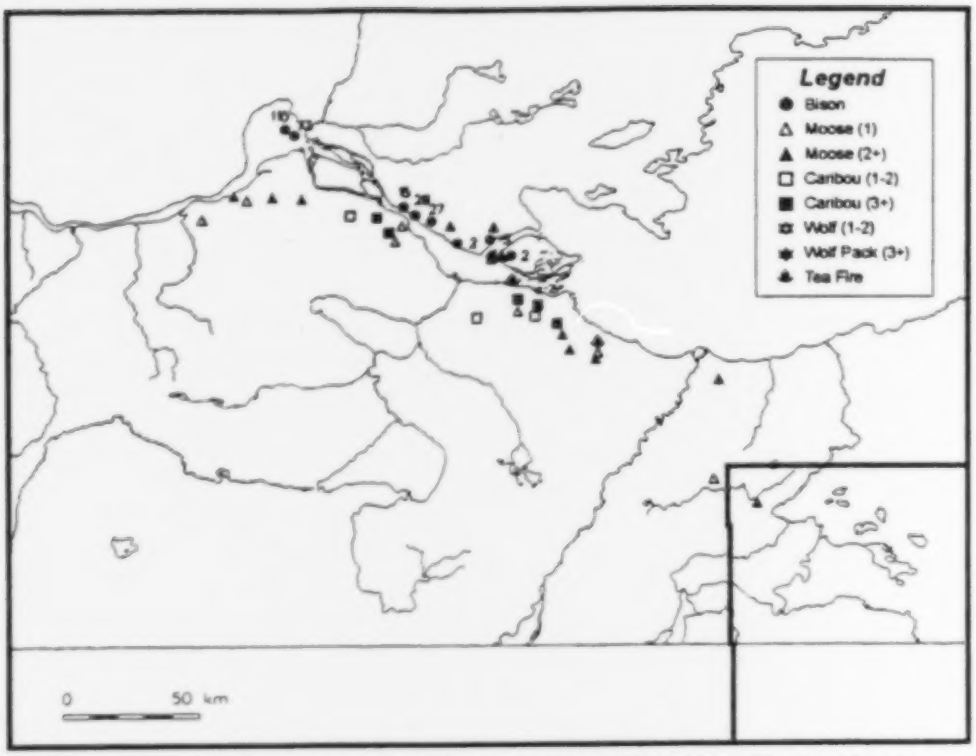
Tessaro, S.V., C.C. Gates, and L.B. Forbes. 1993. The brucellosis and tuberculosis status of wood bison in the Mackenzie Bison Sanctuary, NWT Canada. Can J Vet Res: pp. 231-235.

Wobeser, G. 1992. Disease in northern bison: what to do? A personal perspective. in Foster, J., D. Harrison, I.S. McLaren and B. Champion, (eds.), Buffalo, Univ. of Alberta Press: pp. 179-188.

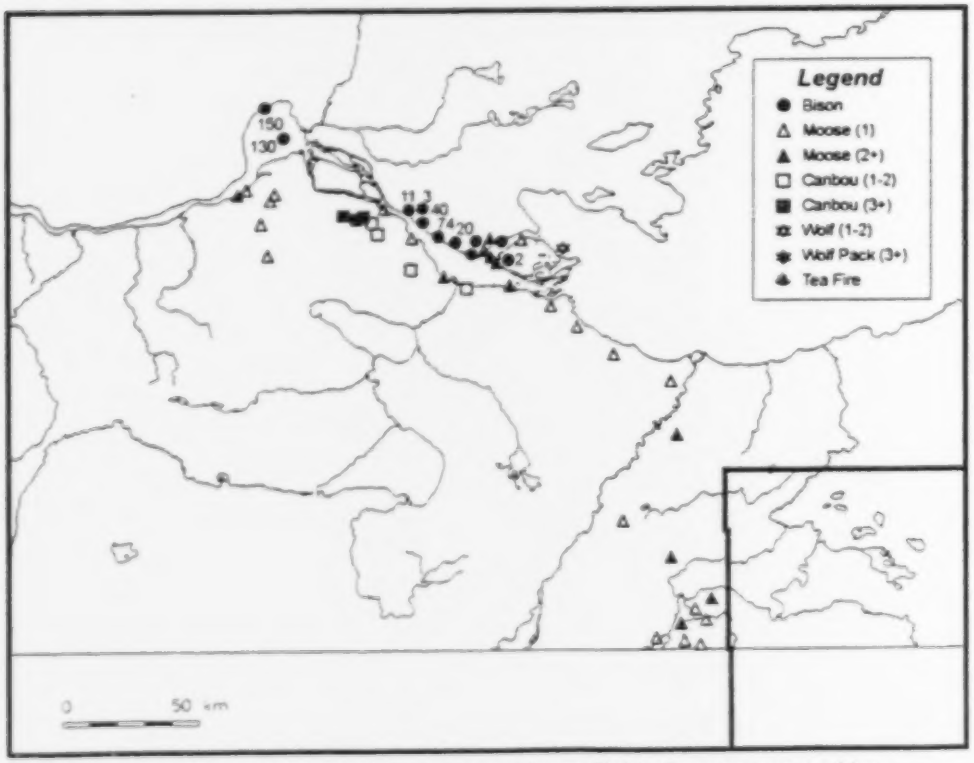
APPENDIX A

Observations of large mammals made during comprehensive aerial surveillance flights in the Bison Control Area Zones I and II during December 1995 - March 1996.

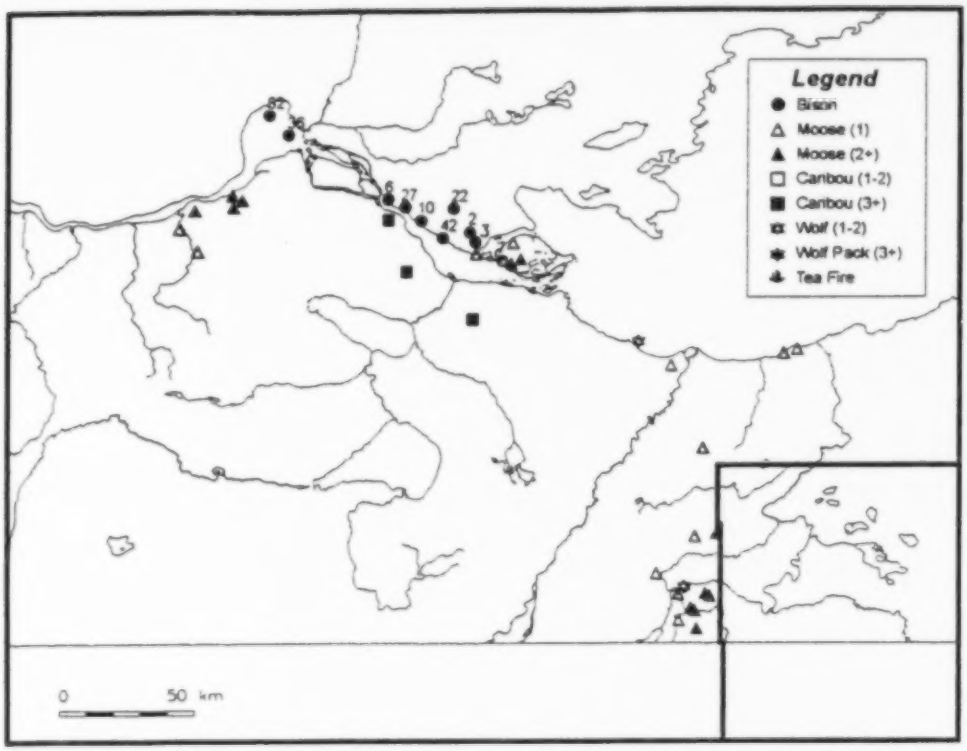
Appendix A



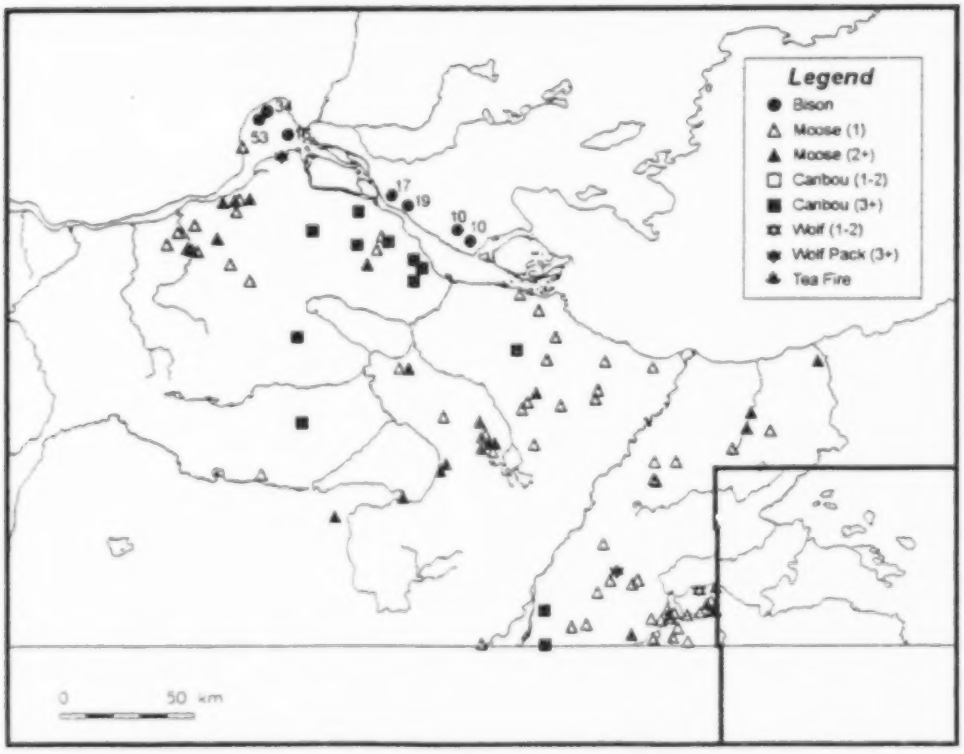
Wildlife observations during the December surveillance flight of zones one and two. In total 254 bison, 51 moose and 57 caribou were sighted.



Wildlife observations during the January surveillance flight of zones one and two. In total 433 bison, 43 moose, 24 caribou and 2 wolves were sighted.



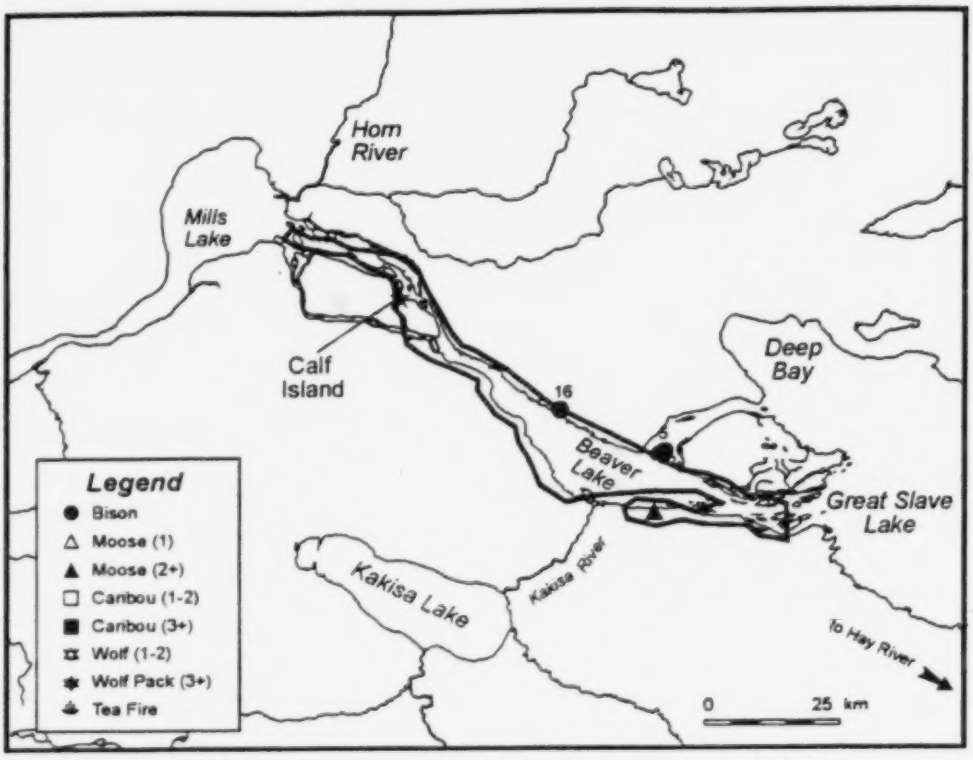
Wildlife observations during the February flight of zones one and two. In total 237 bison, 38 moose, 23 caribou and 2 wolves were sighted.



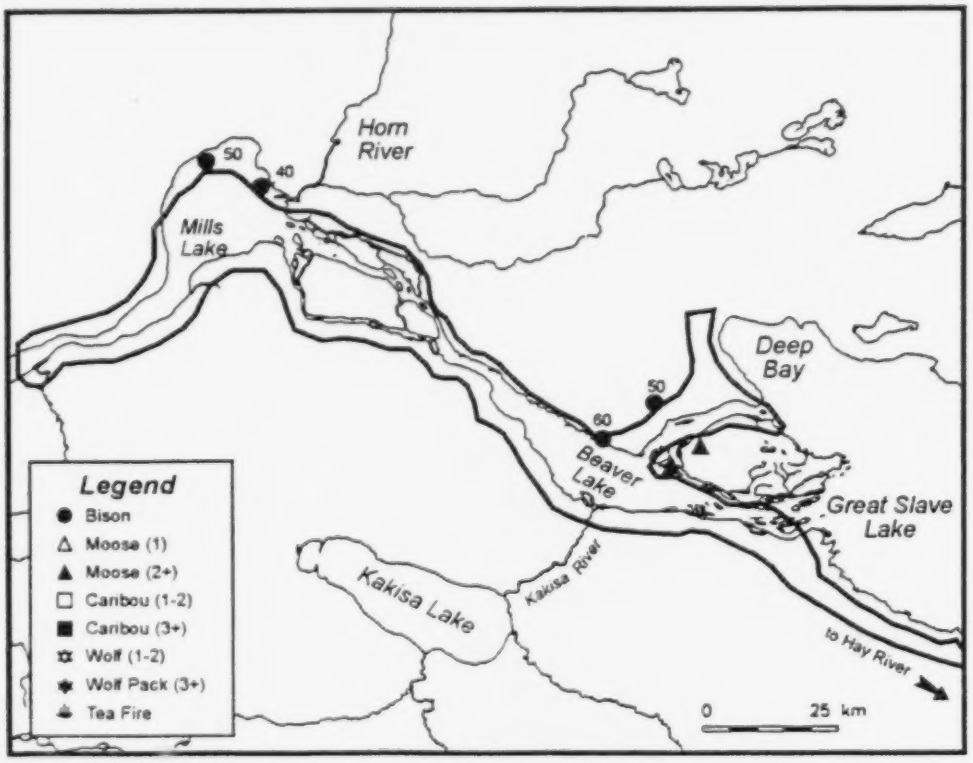
Wildlife observations during comprehensive March surveillance flight. In total 159 bison, 129 moose, 62 caribou, and 14 wolves were sighted in and near the BCA.

APPENDIX B

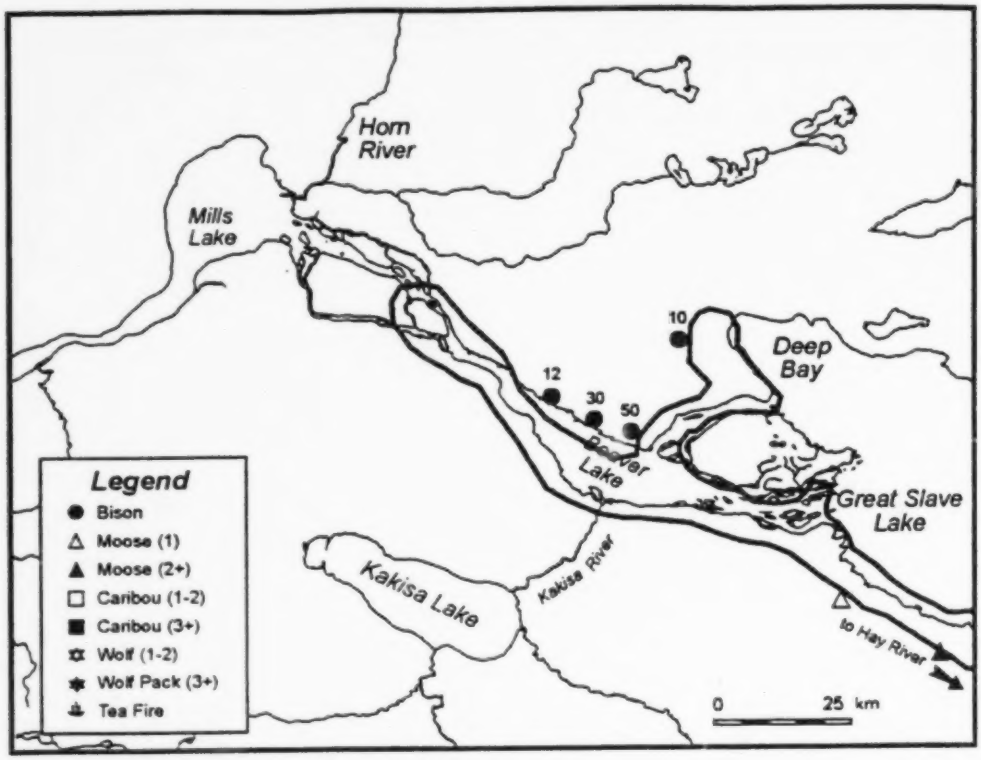
Flight paths and observations of bison made during shoreline patrols along the Mackenzie River during December 1995 to April 1996.



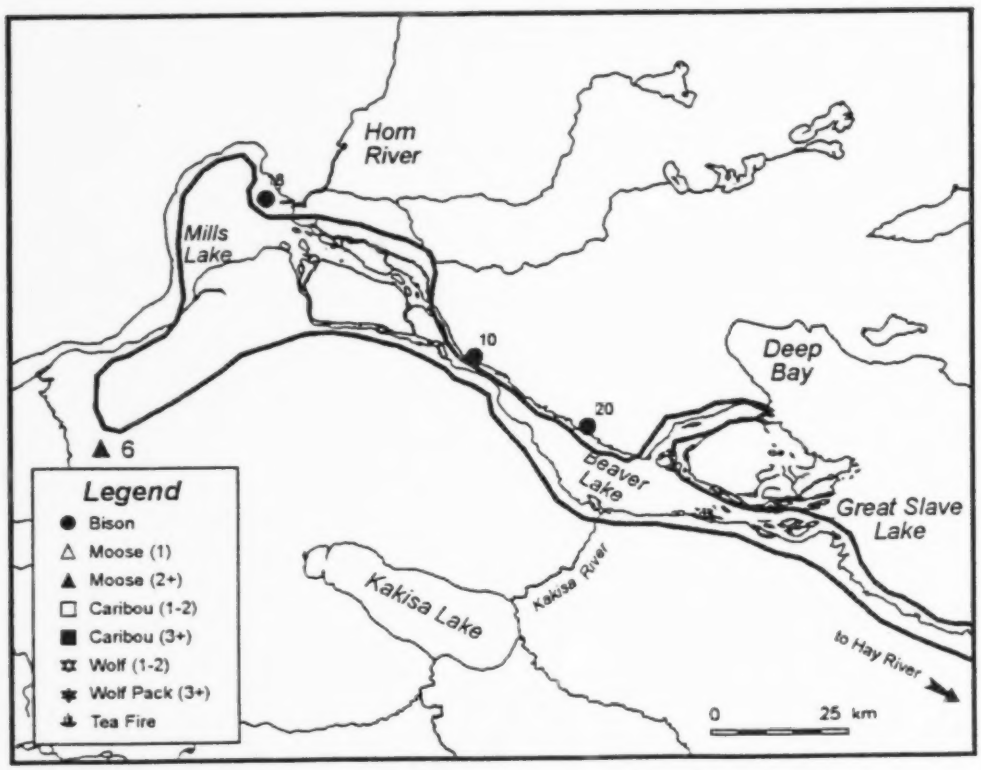
December 19 shoreline surveillance. Calf island was checked out by the local renewable resources officer received a report of bison sighted near the island.



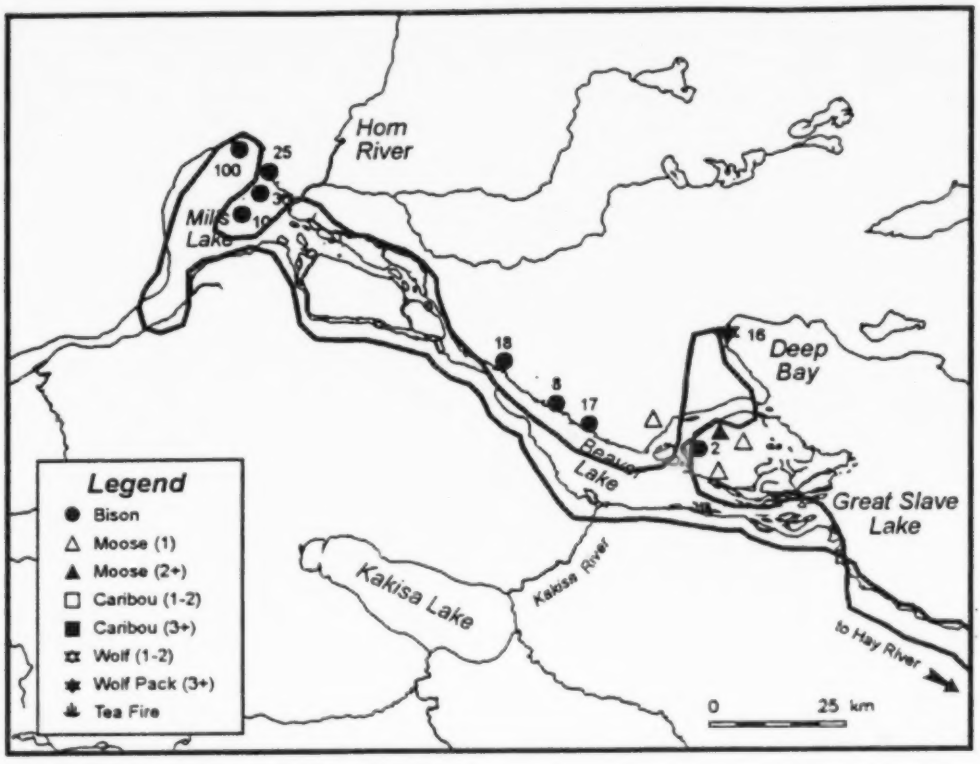
December 28 shoreline surveillance flight.



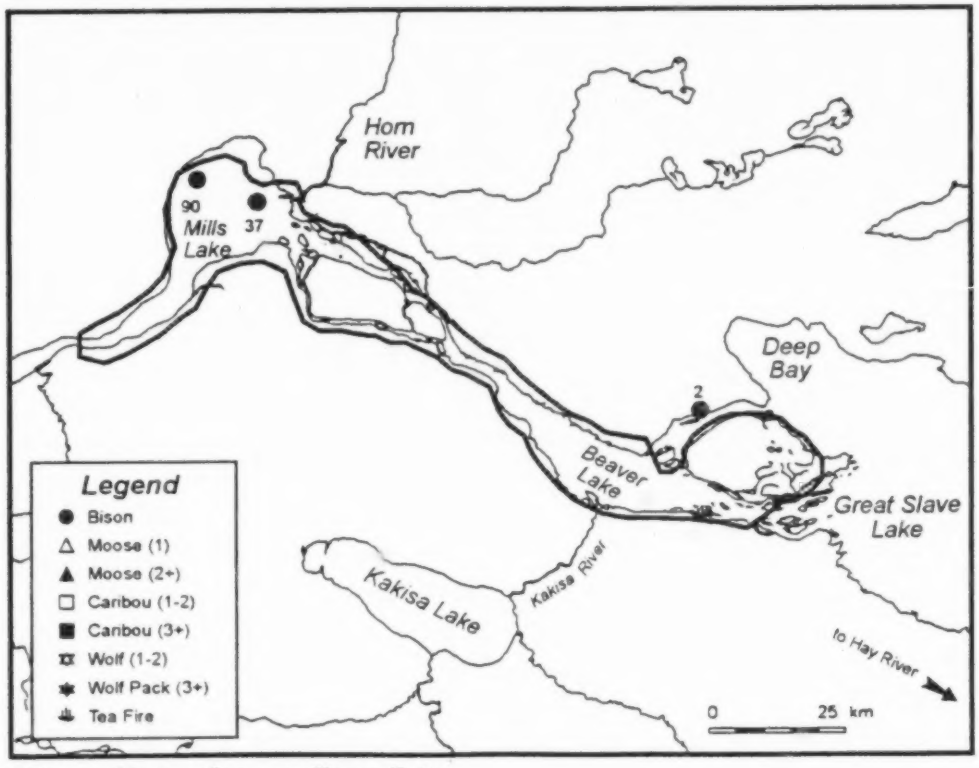
January 3rd shoreline surveillance flight.



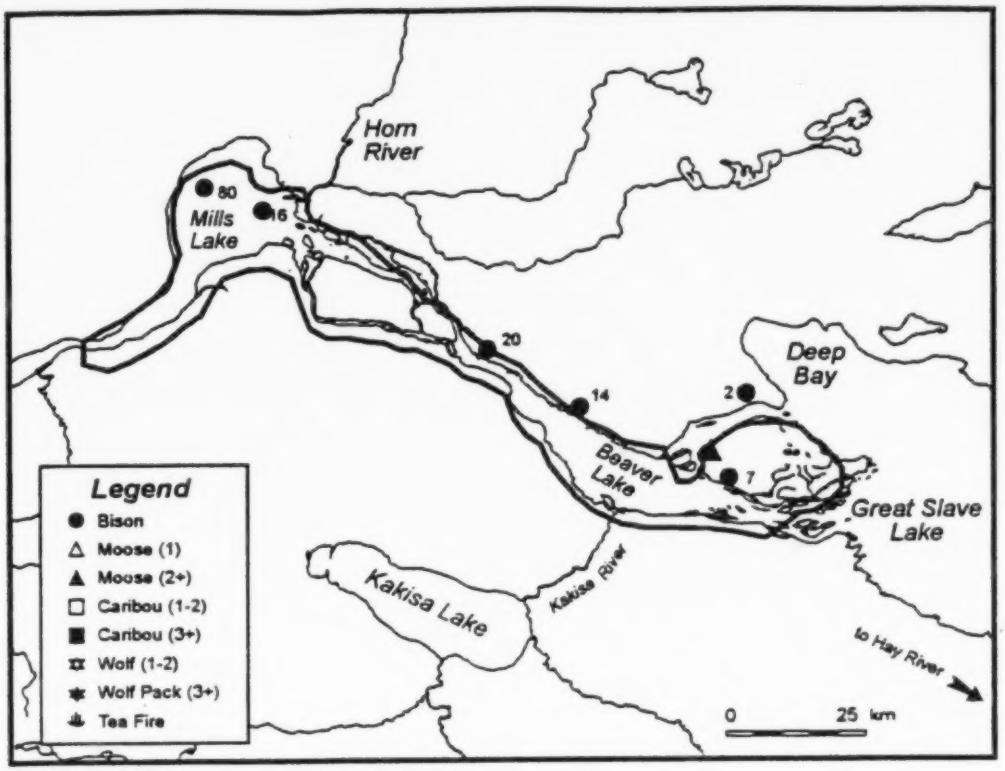
February 1st shoreline surveillance flight.



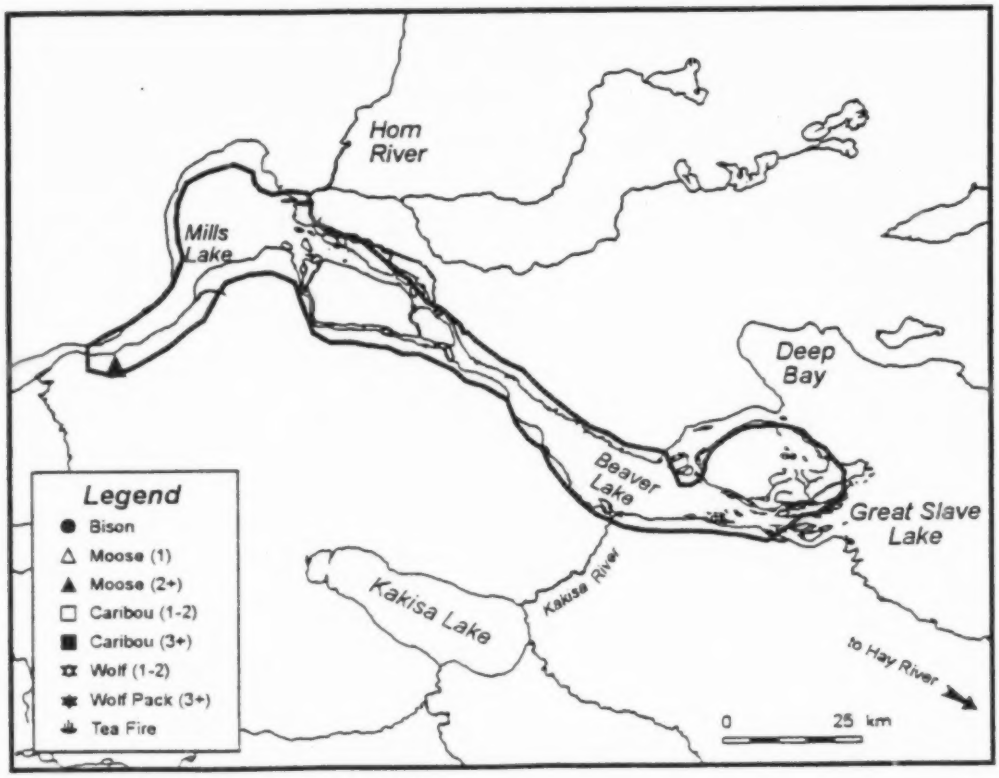
February 8 shoreline surveillance flight.



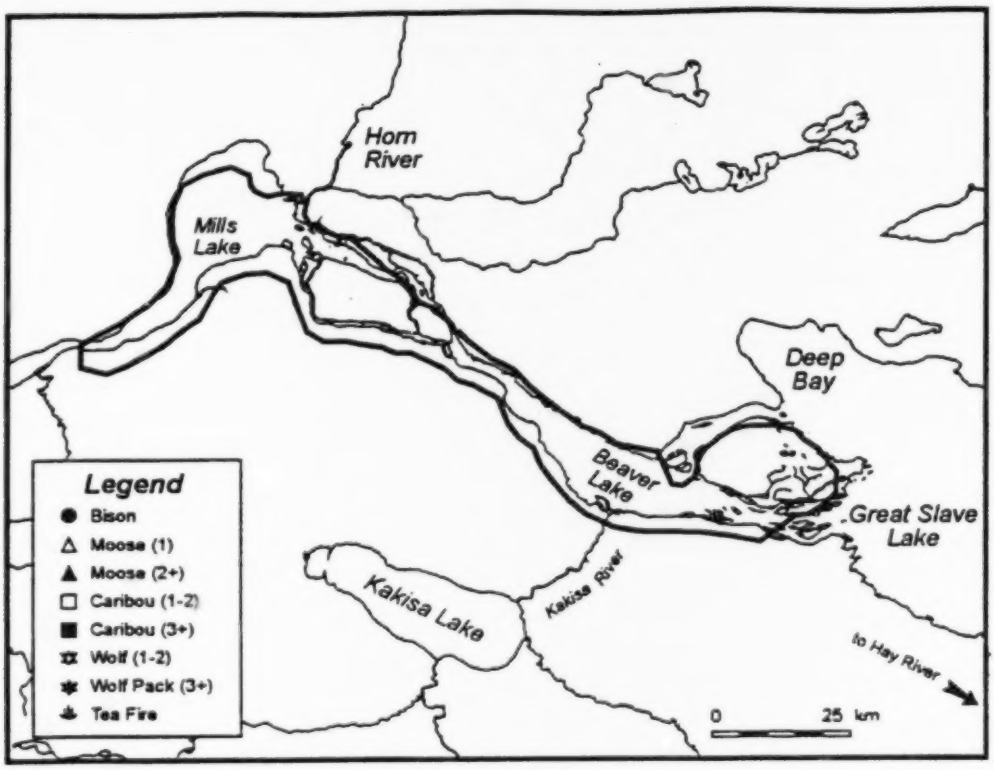
February 22 shoreline surveillance flight.



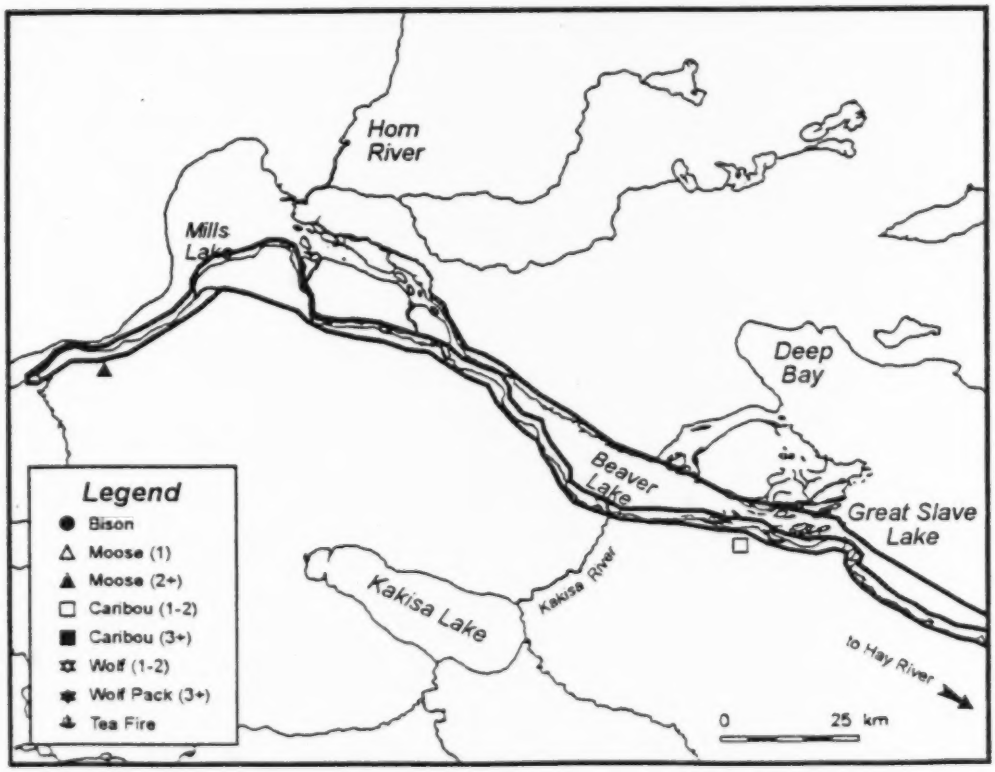
February 29 shoreline surveillance flight.



March 16 shoreline surveillance flight.

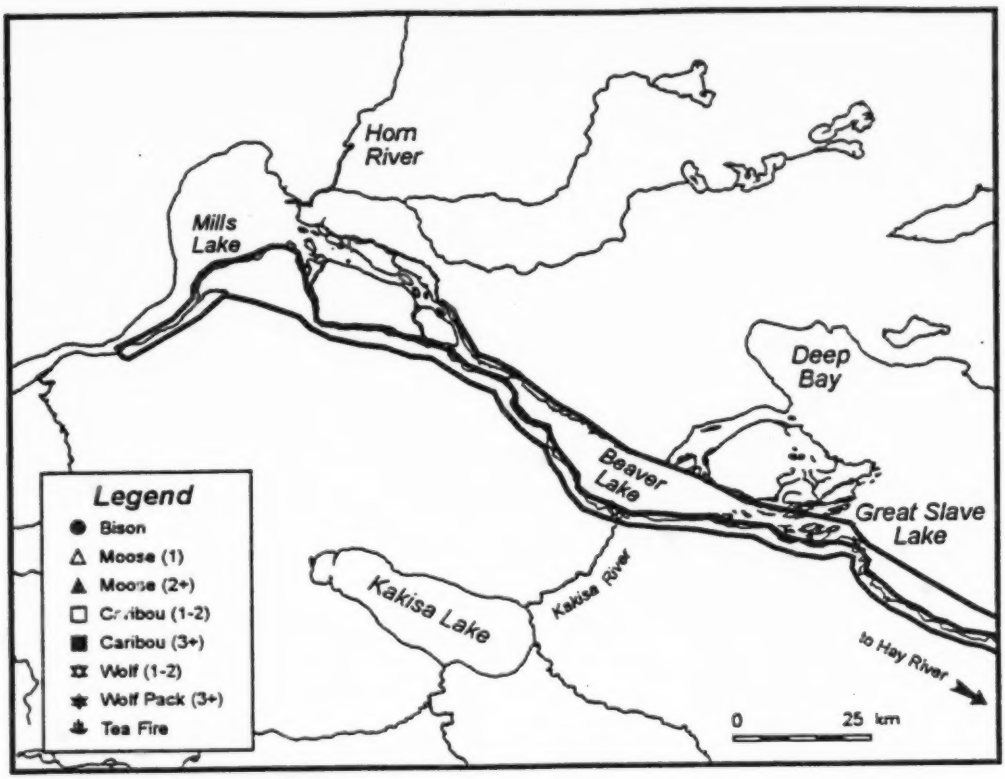


March 23 shoreline surveillance flight.



April 10 shoreline surveillance flight.

Appendix B



April 23 shoreline surveillance.